BIOLOG 3000*i* ™

User Manual

6 AND 12-LEAD SIMULTANEOUS ECG RECORDER

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WARRANTY

All instruments sold and supplied by QRS Diagnostic, LLC are guaranteed to be free from defects in material and workmanship for a period of 3 years from date of purchase. All supplies and accessories carry a 90-day limited warranty. This includes ECG lead wires. If in the judgement of QRS Diagnostic the instrument is proven to be defective during the warranty period it will be repaired or replaced with no charge for parts or labor. An extended hardware warranty is available at additional cost.

This warranty does not cover any instrument that has been damaged by accident, misuse, abuse or has been altered or repaired by anyone other than an authorized QRS Diagnostic agent. This warranty also does not cover any unit that has had a serial number removed, defaced or rendered illegible.

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QRS Diagnostic
14755 27th Ave N
Plymouth, MN 55447

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FOREWORD

Thank you for choosing the BIOLOG 3000*i* portable ECG monitor.

BIOLOG 3000*i* is the world's most portable multi-functional ECG recorder. It which can be used on its own for instant cardiac monitoring or with other System 3000*i* components to provide an integrated diagnostic monitoring system.

The BIOLOG 3000*i* consists of a unit weighing 270 grams and a simultaneous patient cable. This allows you to obtain, store and analyze patient ECG data quickly and with great confidence.

Cardiac records are stored by the BIOLOG 3000*i*, which then can be transferred to QRS Diagnostic's patient management software, CardioView. Alternatively they can be printed to an inkjet printer via the Biolog Printer Interface.

The BIOLOG 3000*i*'s capability to perform electrocardiograms by direct chest placement makes it especially suited for Emergency Care, allowing when necessary the use of real time telephonic monitoring.

We are sure that this device will enhance your medical practice and allow you to achieve a greater level of freedom without losing the power of diagnosis you have been accustomed to.

European Representative:
Advena Ltd.
P.O. Box 30, Leominster
Herefordshire HR6 0ZQ
UK

PRECAUTIONS

WARNING: To prevent the possibility of electrocution, ensure that the rear electrodes are not in contact with the patient while device is connected to any peripheral device.

WARNING: The following precautions need to be taken when a defibrillator is used on a patient:

- Do not touch the patient during defibrillation.
- Do not touch the defibrillator's paddle-electrode surface when discharging the defibrillator.
- Keep defibrillator electrodes well clear of other electrodes or metal parts in contact with the patient.
- If a person is touching the patient, bed, or any conductive material in contact with the patient during defibrillation, the delivered energy may be partially discharged through that person. Make sure persons stand away from the patient, bed, and other conductive material before discharging the defibrillator.

WARNING: Batteries and other disposables used in conjunction with this device must be disposed of in accordance with the national requirements in the country of use.

CAUTION: A 6L Biolog Patient cable or 12L Biolog patient cable is required to be used in conjunction with the BIOLOG 3000*i* in order to provide protection against the effect of the discharge of a cardiac defibrillator and against high frequency burns.
Conductive parts of electrodes and associated connectors, including the neutral electrode, should not contact other conductive parts including earth.
The BIOLOG 3000*i* is not intended to be sterilized or used in a sterile environment and therefore is not suitable for direct cardiac application.
The BIOLOG 3000*i* is not suitable for use with flammable anaesthetics and offers no water ingress protection.
Inspect the BIOLOG 3000*i* electrocardiograph and 6L Biolog Patient Cable or 12L Biolog patient cable regularly for signs of mechanical damage, particularly around patient leads.
To verify correct operation of the electrocardiograph, connect all patient leads to a patient and check that there is a valid ECG signal on every lead by viewing the signal on the BIOLOG 3000*i* screen.

CAUTION: Federal law in U.S.A. restricts this device to the sale by or on the order of a physician.

CAUTION: An authorized QRS Diagnostic, LLC service agent must service this device.

Symbols used on the BIOLOG 3000*i* and patient cables

Attention: Consult accompanying documents.

Patient cable connection socket.

Type BF equipment.

O Power off.

Type BF defibrillator proof applied part.

I Power on.

Class II equipment.

Internally powered device.

Regulatory compliance:

- IEC60601-1 amendments 1 & 2
- C22.2 No 601.1-M90 & UL 2601-1 (when used as part of the BLY-501 adapter system)

TABLE OF CONTENTS

INTRODUCTION 7

1.1 WHAT IS THE BIOLOG 3000*i*? 7
1.2 SYSTEM 3000*i* COMPONENTS 8
1.3 FEATURE LOCATIONS 9

SETTING UP THE BIOLOG 3000*i* 10

2.1 SET UP INSTRUCTIONS 10
2.1.1 Installing the Batteries 10
2.1.2 Start Up 11
2.2 CHECKING THE BATTERY STATUS 12
2.3 THE SET UP MENU 13
2.3.1 To Access the Set Up Menu 13
2.3.2 Navigating through the Set Up Menu 14
2.4 SET UP SCREEN 1 16
2.4.1 LCD Backlight Illumination 16
2.4.2 Mute the QRS Beeping 16
2.4.3 Transtelephonic Mode 16
2.4.4 Automatic Device Identification (ADI) 17
2.4.5 Setting the Time 17
2.5 SET UP SCREEN 2 18
2.5.1 Date Format 18
2.5.2 Setting the Date 18
2.5.3 Enabling Simultaneous Acquisition 18
2.5.4 Total Single Lead Recording Time 19
2.5.5 Selecting the Mains (50/60 Hz) Filter 20
2.5.6 Print Speed 20
2.6 SET UP SCREEN 3 21
2.6.1 Transmission Settings 21
2.6.2 Modem selection 21
2.6.3 Power down 21
2.7 SET UP SCREEN 4 22
2.7.1 Menu Display 22
2.7.2 Saving the Set Up Parameters 22

RECORDING THE ECG 23

3.1 General Preparations 23
3.2 Thorax Placement Option 24
3.2.1 Acquiring an ECG in Thorax Placement Mode 25
3.2.2 Saving a Single Lead ECG to Memory 26
3.2.3 Reviewing an ECG Stored in Memory 26
3.4 Six or Twelve Lead Cable Option 27
3.4.1 Recording an ECG with a 6 or 12 Lead Patient Cable 27
3.4.2 Acquiring and Saving a 6 or 12 Lead ECG 30

PRINTING & TRANSMITTING THE ECG 31

4.1 Telephone Transmission 31
4.2 Digital Transtelephonic Mode 32
4.3 Use with CardioView 35
4.4 Printing with the Biolog Printer Interface 35

MAINTENANCE 36

1. Batteries 36
2. Electrodes 36
3. Cleaning and Disinfection 37

TROUBLESHOOTING 38

APPENDIX A: SPECIFICATIONS 41

APPENDIX B: NOTICES 42

CHAPTER 1

INTRODUCTION

1.1 What is the BIOLOG 3000*i*?

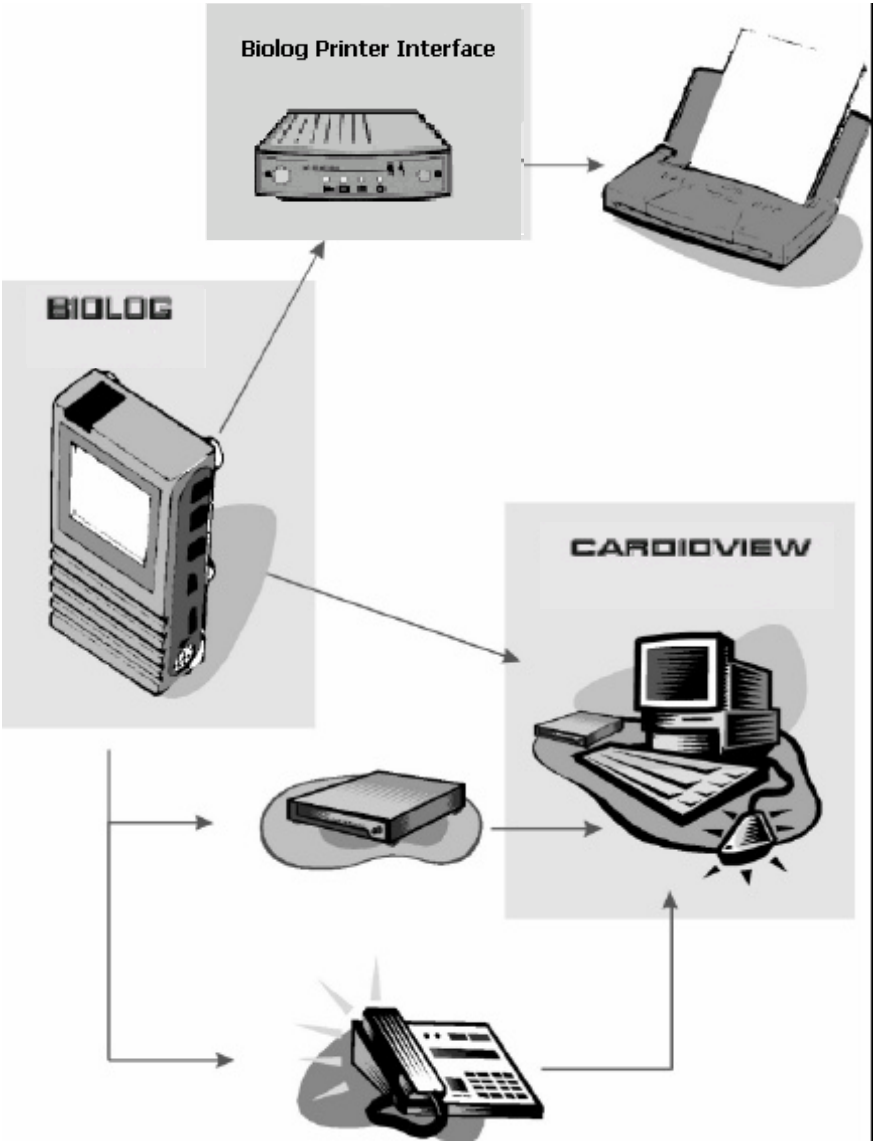
BIOLOG 3000*i* is a hand-held battery operated device designed to:

- Acquire and store in memory 5 to 200 secs. of a single lead ECG via thorax placement.
- Acquire 5 to 80 seconds of simultaneous 6 or 12 Lead ECG, via the 6 or 12 Lead patient cable.

The BIOLOG 3000*i* incorporates the following features:

- Single lead ECG acquisition.
- Diagnostic quality 6 and 12 Lead Simultaneous ECG acquisition.
- High definition LCD screen, readable in bright light and with switchable backlighting for low light conditions.
- Heart rate monitoring (20 to 250 beats per Min.) and display.
- Automatic Device Identification facility for management of recordings.
- Battery status bar on screen.
- Infra-red linked companion printer interface with 25 and 50 mm/second print speeds.
- Transtelephonic transfer of recordings.

1.2 System 3000*i* Components



1.3 Feature Locations

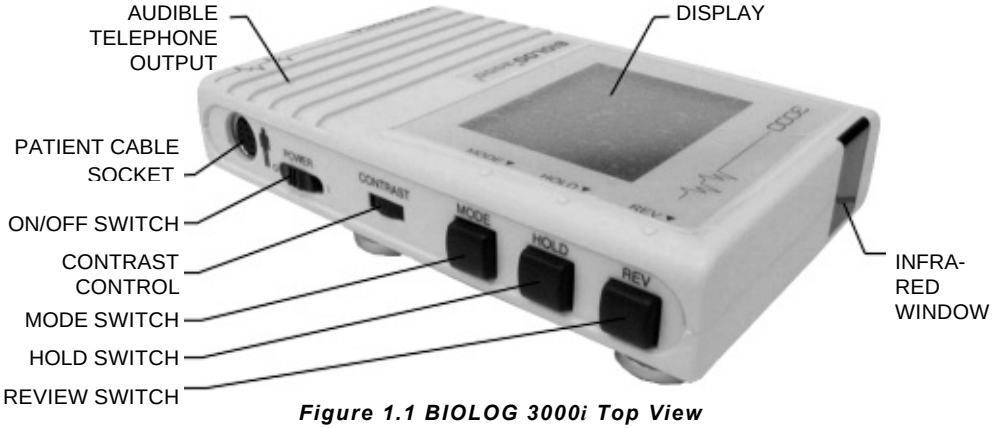


Figure 1.1 BIOLOG 3000i Top View

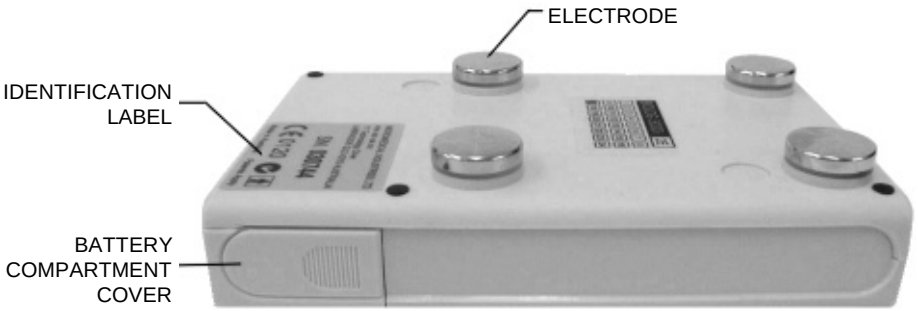


Figure 1.2 BIOLOG 3000i Bottom View

CHAPTER 2

Setting up the BIOLOG 3000*i*

2.1 Set Up Instructions

2.1.1 Installing the Batteries

Your BIOLOG 3000*i* is supplied with two AA (LR6) 1· 5V alkaline batteries.

- Slide the ON/OFF switch to OFF position.
- Remove the battery compartment cover, by pressing down on the cover, while simultaneously sliding it backwards (Figure 2.1).

Figure 2.1 Opening the Battery Hatch

- Load the Batteries with Correct Polarity.
- Match the battery polarity signs with the polarity marked on the interior of the battery compartment casing.

Figure 2.2 Inserting the batteries

- Close the battery compartment

NOTE: Check the batteries were inserted with correct polarity (Figure 2.2).

Align, press and slide the battery compartment cover until the locking catch snaps into position (Figure 2.3).

Figure 2.3 Closing the battery hatch

2.1.2 Start Up

Slide the BIOLOG 3000*i* ON/OFF key to the ON position (Figure 2.4).

The screen will display:

- The title screen for 2 seconds;
- The Set Up Menu for 2 seconds (if configured to); and
- The ECG display screen. If the electrodes are not applied, the center of the screen will show the "Leads Off" symbol: **(- - - - -)**

Figure 2.4: Turning the BIOLOG 3000i on

At any time, you can adjust the contrast of the LCD display with the CONTRAST control button situated on the side of the unit (this may be necessary to produce a visible display if it has been misadjusted).

2.2 Checking the Battery Status

The power remaining in the batteries is displayed on screen by the battery status bar.

The battery status bar is located.

- At the bottom of the Set Up Menu screen (Figure 2.5).
  Or
- At the top of the screen during normal operation (Figure 2.5).

The battery status bar is an indicator of the battery voltage, with 8 segments showing the voltage range for usable operation. You can visually check at any time how much power remains in the batteries.

When the voltage approaches the minimum for reliable operation, the symbol BAT appears at the bottom of the screen. At this stage, you should complete your procedure and replace the batteries, as some operations such as printing and transferring data to a PC cause a dip in the power levels, which can cause the Biolog to shut down without warning.

Battery longevity is affected by backlighting. To preserve battery life, you should turn off the backlight. If you turn the backlight ON or OFF, you will notice that the battery status bar adjusts itself to the new condition.

Figure 2.5: Checking Battery Status

2.3 The Set Up Menu

The Set Up Menu displays the following functions and their current settings:

Screen 1

- The Backlight
- Mute the QRS beeping
- The Transtelephonic Mode
- Automatic Device Identification header for transtelephonic transmission
- Time

Screen 2

- Date format
- Date
- Simultaneous Acquisition Enabled
- Length of recording
- The 50/60 Hz AC Filter
- The Print Speed of the printer

Screen 3

- Infra-red transmission settings
- Modem settings
- Power down time

Screen 4

- Menu Display

2.3.1 To Access the Set Up Menu

There are two ways to access the setup menu:

- If the setup menu appears briefly after power up, press any key while it is displayed. The setup menu only appears at power up if the Biolog has been configured this way.

or

- Press and hold the MODE key, then press the HOLD key at the same time. The HOLD key must be pressed shortly after holding the MODE key, if left too long there will be a timeout and the screen will briefly go blank. If this happens, release both keys and try again. When the setup screen appears, both keys can be released.

2.3.2 Navigating through the Set Up Menu

- **The Hold KEY selects…**

  The Hold key *selects* and highlights the items you wish to change within the Set Up Menu.

  Each time you press the Hold key within the Set Up Menu, the cursor moves to the next field or screen. There is no button to go backwards, if necessary you can repeat the cycle through all of the fields and screens, until again reaching the required field.

- **The Review (REV) Key changes…**

  The Review key *changes* the value of the highlighted selected item. If there is more than one option, you can cycle through all of them until reaching the required selection.

- **The Mode Key saves…**

  Press the Mode key to *save* the new values.

Cancelling changes: The Set Up Menu will revert to previous settings when Mode key is not pressed after changing the Set Up Menu. To confirm cancellation of changed items, turn the power off and on, then review the Set Up Menu.

- The rightmost column of the setup screen displays symbols to remind you to:

(↑)	Press the 'Up' arrow key (REV) to *increase* values
(→)	Press 'Right' arrow key (HOLD) to *select* values
(OK)	Press 'OK' symbol key (MODE) to *save* the settings

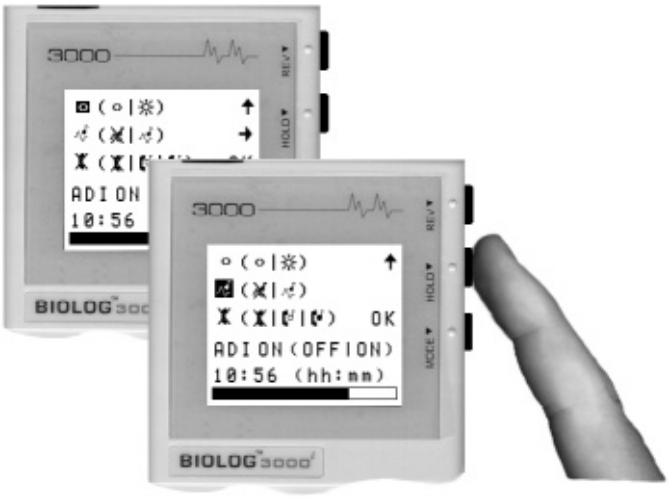


Figure 2.6: Moving the cursor to the desired position

- To increase the number, press the REV key (up arrow) until the desired number is shown. Hold the key down for fast scrolling. Release the key when the desired value is displayed (Figure 2.7).

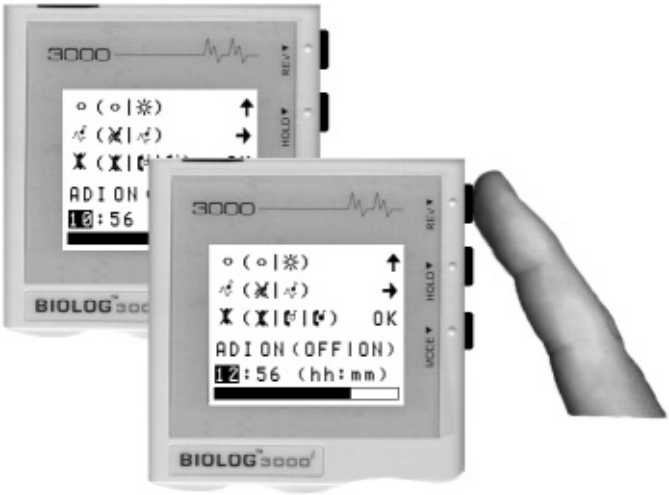


Figure 2.7: Selecting a desired value

2.4 Set Up Screen 1

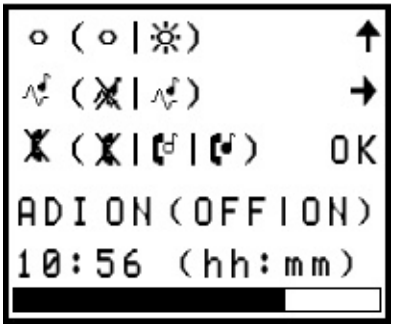


Figure 2.8: Screen 1

2.4.1 LCD Backlight Illumination

The LCD Backlight can be turned ON or OFF as desired.

- First move the cursor to the small circle (○) on the Set Up Menu using the HOLD key.
- To turn the backlight ON/OFF press the REV key. When the backlight is turned on, the small circle symbol changes to a sun symbol (☼).

The Battery Status Bar adjusts itself automatically (Refer to Section 2.2).

2.4.2 Mute the QRS Beeping

Some patients may be disturbed by the beeping sound made on the detection of every QRS.

- To mute this sound, press the HOLD key to select the open symbol (♪)
- To change the setting press the REV key. The symbol will change to (♪), indicating that **QRS Beeping** is muted.

2.4.3 Transtelephonic Mode

BIOLOG 3000*i* is able to transmit a stored ECG recording, using acoustic coupling via a telephone to a remote site equipped with a suitable reception system. This is provided for backward compatibility with old systems, and is no longer supported. Transmission by digital modem is now recommended (see modem selection).

The following table highlights the different transtelephonic modes of the BIOLOG 3000*i*.

Symbol	Meaning
	DEFAULT MODE: Analog transtelephonic mode is disabled. *Choose this mode for silence during recording or review.*
	Analog transtelephonic mode is enabled only for the review or transmission of data. The acquisition of data is silent. *Choose this mode for silence during recording. Sound will be emitted during review.*
	Analog transtelephonic mode is enabled for the acquisition, review and transmission of data. *This mode is for transtelephonic transmission of the ECG in real time to a receiving center. Sound will be emitted during recording and review.*

2.4.4 Automatic Device Identification (ADI)

You can send the serial number of your BIOLOG 3000*i* monitor when sending a transtelephonic ECG with your BIOLOG 3000*i* to a reception center equipped with QRS Diagnostic's CardioView software. This facility is called Automatic Device Identification or ADI in brief.

Turn the ADI ON if sending an ANALOG Transtelephonic recording to CardioView. Turn ADI OFF if sending an ANALOG Transtelephonic recording to a non-QRS Diagnostic receiving station.

- To Select the ADI function, press the HOLD key.
- To change the setting press the REV key.

2.4.5 Setting the Time

- To change the time, move the cursor to the appropriate position (HH for hours or MM for minutes) by pressing the HOLD key (right arrow) repeatedly.
- Press the REV key (up arrow) to change to the desired time.

NOTE: The time is preset in 24-hour format (e.g. 3:30 PM will be shown as 15:30). The factory setting is Australian Eastern Standard Time.

2.5 Set Up Screen 2

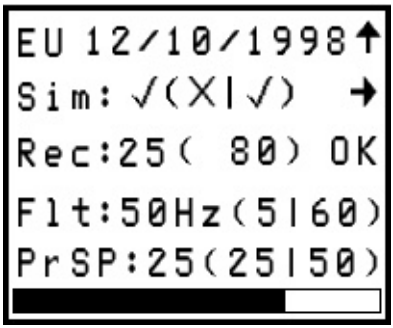


Figure 2.9: Set Up Screen 2

2.5.1 Date Format

- To change the date format from DD:MM:YY (European) to MM: DD:YY (US), move the cursor by pressing the HOLD key (right arrow) repeatedly until the symbol (EU) is highlighted.
- To change the date format to US format (MM:DD:YY), press briefly the REV key (up arrow). The symbol (US) will appear on the screen and the date format will change to MM:DD:YY.

The date format is preset DD:MM:YY (European format).

2.5.2 Setting the Date

- To change the date, move the cursor to the appropriate position (MM or DD or YY) by pressing the HOLD key (right arrow) repeatedly.
- To set the date briefly press the REV key (up arrow).

2.5.3 Enabling Simultaneous Acquisition

The Sim selection ***must be enabled*** before the BIOLOG 3000*i* can be used with the 6 or 12 Lead simultaneous cable.

Even if the Sim selection is changed and saved, the ECG in memory will still be stored. If the BIOLOG 3000*i* is turned OFF during Set Up any changes to the Set Up will not be saved, however, the current saved ECG will be preserved.

2.5.4 Total Single Lead Recording Time

The memory of the BIOLOG 3000*i* is programmable (in 5 second increments) between 5 and 200 seconds for a single lead ECG.

It is also possible to record a single rhythm strip off a 6 or 12 Lead simultaneous cable. When the 6 or 12 Lead is enabled you can record between 5 and 80 seconds of single lead ECG.

To change the Recording Time, move the cursor to the Recording Time area, **Rec**, by pressing the HOLD key and then increment the Recording Time by pressing the REV key.

Figure 2.10 Changing the single lead recording time

2.5.5 Selecting the Mains (50/60 Hz) Filter

You can select between 50 Hz and 60 Hz filters, in accordance with the mains current, in the country of use. The default factory setting is 50 Hz.

- To select a 60 Hz mains filter value, move the cursor to the symbol 50 position, by pressing the HOLD key repeatedly.
- To change the mains filter to 60 Hz, simply press the REV key (Figure 2.11).

Figure 2.11: Selecting Mains Filter

2.5.6 Print Speed

The Biolog Printer Interface can be set to either 25mm/sec or 50mm/sec.

- To select print speed press the Hold key (right arrow).
- To set print speed press the REV key to the desired value 25mm/sec or 50mm/sec.

2.6 Set Up Screen 3

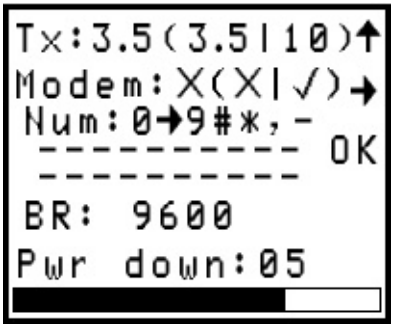


Figure 2.12: Screen 3

2.6.1 Transmission Settings

When transmitting to the Biolog Printer Interface, or Analogue Transtelephonic transmission to CardioView, the BIOLOG 3000*i* may be set to transmit either 3· 5 seconds per lead or 10 seconds per lead.

2.6.2 Modem selection

Selecting this (√) allows the BIOLOG 3000*i* to communicate with a modem or GSM digital mobile phone (refer to section 4.2). This also allows the user to enter the modem telephone number (Num) to be dialed, as well as selecting the Baud Rate (BR) at which the BIOLOG 3000*i* will communicate with the modem or GSM digital mobile phone.

2.6.3 Power down

This is an adjustable time in minutes, after which the BIOLOG 3000*i* will turn off if not in use. If this value is set to zero, the power down function will be cancelled.

2.7 Set Up Screen 4

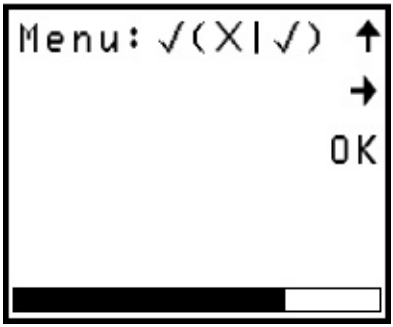


Figure 2.13: Screen 4

2.7.1 Menu Display

Selecting this (√) allows the set up menu to be displayed briefly when turning on the BIOLOG 3000*i* as mentioned in section 2.3.1. If (X) is selected the menu will not be displayed on start up, however, it can still be accessed by pressing the MODE and HOLD keys simultaneously.

2.7.2 Saving the Set Up Parameters

To save the Set Up Menu parameters, press the MODE key (OK on the display) at any time during the set up (Figure 2.12).

When OK is selected, the new set up parameters will be adopted and any old parameters will be cleared.

Figure 2.14: Saving the set up menu parameters

CHAPTER 3

RECORDING THE ECG

3.1 General Preparations

Place the patient in an 'at rest' position, preferably prone on their back.

Turn the BIOLOG 3000*i* on by sliding the power switch on (Figure 2.4).

To change or review any of the **Set Up** parameters, refer to the **Set Up Menu Instructions**. If no changes are needed, allow the BIOLOG 3000*i* to proceed to the ECG display screen.

For best results:

- For better contact when applying the BIOLOG 3000*i* directly on the skin surface, moisten the electrodes with electrode gel or water.

When using patient cable accessories:

- Use with Ag/AgCl ECG “skin” electrodes. Attach all electrodes before turning the unit ON ().
- Keep the patient and cables as motionless as possible during monitoring.
- Lay the BIOLOG 3000*i* on a flat surface during monitoring to ensure least disturbance.

Two options are available to obtain the ECG, Thorax placement and 6 lead or 12 lead patient cable acquisition.

After briefly displaying the set up menu for 2 seconds, the BIOLOG 3000*i* goes into the ECG display screen (Figure 3.1).

SINGLE LEAD mode is indicated by the symbol SL at the bottom of the ECG display screen.

NOTE: The gain of the ECG can be switched between 5(Л) and 10 (Л) mm/mV. The normal adult setting should be 10 mm/mV, which is represented by a taller calibration symbol at the bottom of the center ECG Display screen. To select 5 mm/mV (e.g. for pediatrics applications) briefly press the REV key.

Figure 3.1: The ECG Display screen

3.2 Thorax Placement Option

Place the BIOLOG 3000*i* on the patient's left anterior chest with the electrode feet firmly against the skin.

For ideal placement in Lead II, when viewing the BIOLOG 3000*i* from the front:

- The lower right electrode foot is the positive electrode (+). It should be placed over the apex of the heart.
- The upper left electrode foot is the negative electrode (–). It should be placed on the sternum, as close as possible to the manubrium.
- The other two electrodes act as references, with at least one reference electrode in contact with the thorax.
- The BIOLOG 3000*i* is now ready for monitoring.

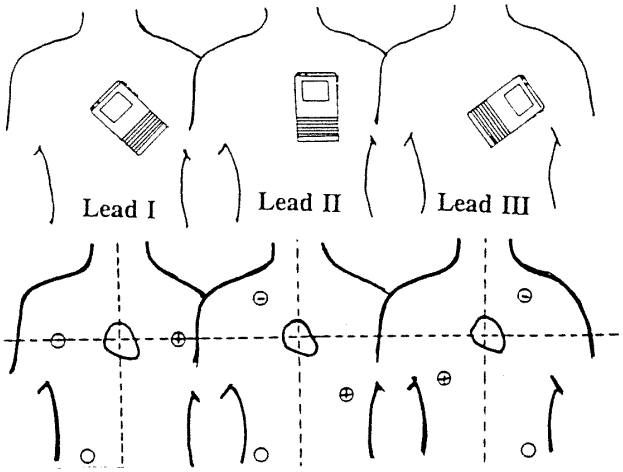


Figure 3.2: Different Leads using Back Electrodes

3.2.1 Acquiring an ECG in Thorax Placement Mode

- Turn on the BIOLOG 3000*i* as described above. Allow the unit to settle in ECG display mode.
- Place the BIOLOG 3000*i* on the patient's chest as indicated above.
- The leads off (– – – – –) indication should vanish, and after a few seconds, the baseline of the patient's ECG will settle down and appear on the screen. Maintain the BIOLOG 3000*i* in this position for at least as long as the Recording Time selected in the **Set up Menu**.

To change or review any of the set up parameters, refer to the **Set Up Menu Instructions**.

3.2.2 Saving a Single Lead ECG to Memory

- To save an ECG to memory, press the HOLD button, at the end of the ECG recording (Figure 3.3).
- A **H** will appear in the lower right of the screen. This indicates that the ECG is saved and stored in the memory. It will remain in memory until a new ECG is recorded and saved.

NOTE: The BIOLOG 3000*i* is equipped with a small backup battery. It will keep its memory when the unit is turned OFF or when the batteries are removed for replacement.

Figure 3.3: Saving an ECG to memory

3.2.3 Reviewing an ECG Stored in Memory

To review an ECG stored in memory:

- Press the REV button for about 1 second until a long beep is heard. The ECG saved in memory will begin scrolling across the screen. A **R** will be displayed in the right lower corner of the screen to indicate that the unit is in REVIEW mode (Figure 3.4).
- To freeze any portion of the ECG for closer examination, press the HOLD key once. To release the freeze, press the HOLD key once again. This can be done as often as desired.
- A review can be performed as many times as desired on an ECG saved in memory.

Figure 3.4: Reviewing a stored ECG

3.3 Six or Twelve Lead Cable Option

The 6 or 12 lead BIOLOG 3000*i* cable is used to perform simultaneous 6 or 12 lead ECG acquisition and monitoring.

Alternatively, the operator is able to record a single rhythm strip off any one of the six or twelve leads. This recording can be between 5 and 80 seconds (Refer to Section 2.5.4).

NOTE: To use the 6 or 12 lead Biolog Patient cable with the BIOLOG 3000*i* the Sim option must be enabled in set up menu 2 (see section 2.5.3).

3.4.1 Recording an ECG with a 6 or 12 Lead Patient Cable

- Plug the 6 or 12 lead patient cable into the cable socket (Figure 3.5).

Figure 3.5: Connecting Cables to the BIOLOG 3000i

- Turn the BIOLOG 3000*i* on and allow it to cycle to the ECG display screen. The BIOLOG 3000*i* automatically detects the presence of the 6 or 12 lead cable and displays lead I I on the screen (Figure 3.6).

Figure 3.6: Monitoring Screen with 12-lead Cable Connected

- Turn the BIOLOG 3000*i* off and attach the leads to the patient's chest (Figure 3.9).

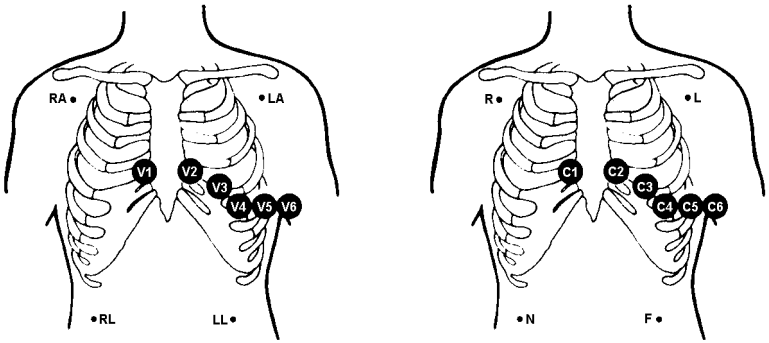


Figure 3.7: Anatomical Positioning of the 6 or 12 lead Cable Electrodes

- Once attached, lead II will automatically begin monitoring. If any lead other than lead II is desired as the rhythm strip, briefly press the MODE key and release. This will advance the selected rhythm strip to lead III. Any lead may be selected by repeatedly pressing the MODE key. Leads available for selection are identified as I, II, III, AVR, AVL, AVF for the 6 lead cable and I, II, III, AVR, AVL, AVF, V1, V2, V3, V4, V5 and V6 for the 12 lead cable.
- Once the lead is selected, the BIOLOG 3000*i* will continue to monitor that lead until you are ready to record and save.

Figure 3.8: 12 Lead Biolog Patient Cable

3.3.2 Acquiring and Saving a 6 or 12 Lead ECG

- To begin recording the simultaneous 6 or 12 lead samples, ensure that all leads are attached reliably, then press and hold down the MODE key until a multiple beep is heard (Figure 3.11). This will place the BIOLOG 3000*i* in automatic acquisition mode as indicated by an A in the lower right corner of the screen. The 6 or 12 leads will then be simultaneously recorded.

Figure 3.9: Starting 12-lead ECG Acquisition

The BIOLOG 3000*i* will automatically save each of the leads when the recording is finished. When all leads have been sampled, a multiple beep is sounded, and a screen will display the status of the acquisition. To exit this screen, press the MODE key (to return to rhythm strip monitoring) or REV (to print and/or review).

As the BIOLOG 3000*i* simultaneously records from the 6 or 12 lead cable, it checks to ensure that each lead is attached. If any detachments are found, these will be indicated on the screen at the end of the recording as shown at Figure 3.10. If this message appears, the user should check the lead highlighted for faulty electrode connections. NOTE: if limb leads are detached, chest lead detachments may not be detected, or the recording may not be able to proceed in the first place.

Figure 3.10: Leads off message after a 6 or 12 Lead Recording

CHAPTER 4

PRINTING & TRANSMITTING THE ECG

The BIOLOG 3000*i* has a number of methods of printing and transmitting its data, after a recording has been made (Refer to Section 1.2).

4.1 Transtelephonic Transmission

This is provided for backward compatibility with old systems, and is no longer supported. Transmission by digital modem is now recommended (see next section).

To use this option:

The BIOLOG 3000*i* must be set to TRANSTELEPHONIC MODE (Refer to section 2.4.3.).

Dial the number of the reception station then place the telephone mouthpiece over the Audio Outlet located on the lower right of the unit's face (Figure 4.3).

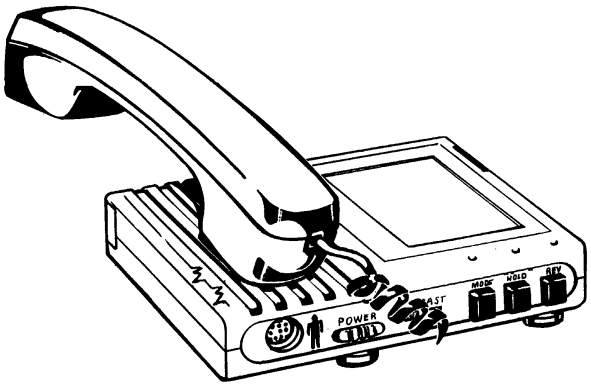


Figure 4.3: Setting up BIOLOG 3000i for transmitting an ECG by telephone

Depress the REV key and hold until the long audio tone is heard (Figure 4.4). The recorded ECG will be heard during the transmission.

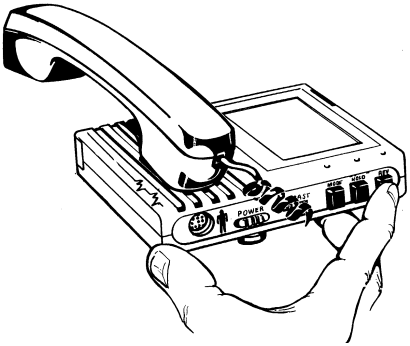


Figure 4.4: Transmitting an ECG by telephone

During the transmission a high pitched variable audio tone will be heard. To ensure a clear transmission, avoid moving the BIOLOG 3000*i* or telephone handset during the transmission.

4.2 Digital Transtelephonic Mode

The BIOLOG 3000*i* has the ability to send your ECG by a standard modem or GSM digital mobile phone for interpretation by CardioView. This digital transfer allows for high speed, accurate transmission of ECG data.

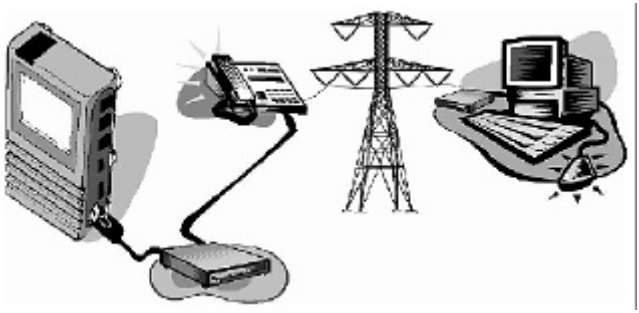


Figure 4.5: Digital Transtelephonic ECG Data Transfer

You will need a Biolog to Modem Adapter Cable and a standard serial adapter or cable from the modem to a DB9 female socket.

To transfer a stored ECG to CardioView by modem, enable the modem field in Set up screen 3 (refer to section 2.6). Enter the full telephone number of the receiving station, and set the baud rate as recommended by your modem manufacturer (refer to section 2.6). The telephone dial string may contain the following:

0…9	Normal telephone number digits
A…D	Normal telephone digits
#	Hash key
*	Star key
,	Dial pause (for switchboards)
T	Tone dialling (default)
P	Pulse (decadic) dialling
W	Wait for dial tone
@	Wait for silence
!	Flash/On hook
– and <space>	Ignored: may be used to format the dial string

Power the BIOLOG 3000*i* on, and then connect the BIOLOG 3000*i* to the modem or digital mobile phone using the cable. Press and hold the REV button to start the transfer.

NOTE: The receiving station must be ready to receive the data (refer to the CardioView user manual for more information).

The BIOLOG 3000*i* should make the call and send the data automatically.

If there is a failure in the connection to the modem, it is not switched on, or the baud rate is incorrect, a higher then a lower long tone will sound and normal review mode will be entered.

If the modem is connected and operating correctly, a screen headed "Transfer Mode" will appear. Below this, the modem's responses to the setup string and dial command will be displayed. If the response "ERROR" is seen then the modem has a problem with the initialization string or the dial string. You will need to set the "init" string to values recommended by your modem instructions, and ensure that the dial string does not contain any incorrect characters. Note that configuration of the "setup string" requires the Biolog 3000i Setup utility, supplied with CardioView.

There will be no response to the dial string for a time while the call is made and the remote station answers. If this takes more than 60 seconds the process will abort (there is a counter at the top of the screen showing the progress of the timeout). If the line is busy or there is a problem establishing the connection you may see the message "NO CARRIER" in which case press any key to reset the Biolog and try again.

When connection is established a progress indicator "DATA >>>>" will extend to the right of the screen until the call is completed. Below this "Connected to .." (name of the receiving station, defaults to Cardioview) will be shown. Pressing any key during the data transfer will abort the transmission.

When the transmission is complete the BIOLOG 3000*i* will display a message "Data transfer successful" (or unsuccessful). Below this will be displayed "Received by .." (name of the receiving station, defaults to Cardioview) followed by the date and time.

To return to the normal mode of operation press any key. The Biolog will reset and go through the normal power up sequence.

NOTE: The BIOLOG 3000*i* should work with any modem 100% compatible with the Hayes command set.

The modem initialization string can only be edited using the BIOLOG Setup utility provided with CardioView. The BIOLOG 3000*i* is factory pre-set to AT&FX0W2E1&K0. This should work with the majority of modems, but in some cases (eg GSM mobile phones) it will be necessary to simply use AT&F.

CAUTION: There may be a hazard associated with using a GSM phone close to hearing aids and pacemakers. A GSM phone should not be used within a 5 metre range from these devices. GSM phones can also interfere with the ECG signal.

4.3 Use with CardioView

The BIOLOG 3000*i* can be used with QRS Diagnostic's CardioView software. For more information please refer to the user manual or consult your nearest QRS Diagnostic distributor.

4.4 Printing with the Biolog Printer Interface

Stored ECGs can be printed using the Biolog Printer Interface.
For more information, please refer to the Biolog Printer Interface user manual or consult your nearest QRS Diagnostic distributor.

CHAPTER 5

MAINTENANCE

1. Batteries

Should the BIOLOG 3000*i* not operate properly when turned ON, check the battery polarity. Incorrect battery insertion may damage the unit.

Only alkaline AA (LR6) 1.5V batteries should be used in the BIOLOG 3000*i*. Do not use Rechargeable Nickel/Metal Hydride batteries with the BIOLOG 3000*i*.

NOTE: Please consult your local supplier for further details.

Without electrode contact (through the electrode feet or through the patient cable), the BIOLOG 3000*i* will turn itself off automatically after the period of time specified, (section 2.6.3 power down), to preserve battery longevity.

In continuous use the batteries will last approximately for more than 10 hours with backlighting and more than 24 hours without backlighting.

To preserve battery life turn backlighting off when not needed and turn unit off when not in use.

Remove batteries from the unit if not being used over a long period of time, as they may leak and cause damage to the unit.

2. Electrodes

The contact electrode feet at the back of the BIOLOG 3000*i* are made of high grade stainless steel and are corrosion resistant.

Wipe the electrode feet clean of gel or other residue after each use. Residue left on the electrodes may affect the BIOLOG 3000*i* sensitivity.

3. Cleaning and Disinfection

BIOLOG 3000*i* can be cleaned and disinfected very simply, as follows:

To clean the BIOLOG 3000*i* plastic case, wipe the surfaces of the case with a clean cloth moistened with water only.

To clean the display, gently wipe the plastic display lens with a soft, damp cloth moistened with water or a commercial glass cleaner.

NOTE: Do not wipe the case or the display lens with alcohol. Alcohol will damage plastic surfaces over time, and may cause them to crack. In addition, the display lens may become 'foggy' in appearance.

To disinfect the BIOLOG 3000*i*, wipe the back of the device, including the electrodes, with a hospital grade disinfectant.

NOTE: Do not saturate the BIOLOG 3000*i* with any liquid because excess fluid could enter the case and damage the electronics.

CHAPTER 6

TROUBLESHOOTING

Symptom, Likely Problem and Solution

If you should experience any difficulty when using your BIOLOG 3000*i*, please review the suggestions for troubleshooting some minor difficulties presented below. If you cannot resolve the difficulty after following these procedures, please contact your supplier, or call QRS Diagnostic, LLC.

No power: the unit is off after being on.

When not engaged in real-time monitoring, the BIOLOG 3000*i* will automatically shut off after the period of time specified, (section 2.6.3 power down), to conserve battery power. Move the ON/OFF Switch to the OFF position, then turn the unit ON again.

If the unit shuts down during download to PC or printing, it is likely that the batteries are flat or are not of the recommended type. Replace the batteries if this is occurring. Turning off the backlight may give some extra operational time if no fresh batteries are immediately available.

NOTE: Data stored in memory will not be lost.

No power: the unit will not turn on.

The batteries are flat or they are not properly installed. Remove the Battery Compartment cover and check the position of the batteries (refer to section 2.1.1 Installing the batteries).

Try adjusting the contrast knob. If misadjusted, no display will be visible.

If the unit is more than 4 years old, the unit may need servicing. Ensure that the previous steps have been taken, and if necessary return it to an authorized QRS Diagnostic, LLC service center.

'BATT' Message Appears in the Display.

Battery voltage has dropped below an acceptable level. The BATT message will remain on the screen until the batteries have been replaced. Complete the procedure and change the batteries as soon as possible.

'– – – – – ' Appears in the Display.

This is a normal message indicating the “Leads Off” condition. It will appear if any electrodes fail to make good contact with the skin. Check the electrode skin contact until the ECG monitoring mode is established.

If using a multi lead cable, also check any electrode adapters by swapping them. If a leads off indication occurs consistently for a particular patient lead after changing the electrode and the adapter, it may indicate a fault in the lead, in which case please contact your QRS Diagnostic, LLC service center.

NOTE: For better direct thorax contact, moisten the back electrodes.

ECG signal appears noisy or shows interference.

Check that the ECG electrodes are well adhered and applied according to the manufacturer's instructions. Distance the BIOLOG 3000*i* and the patient from other electrical equipment.

“This cable is incompatible with the 3000i” Message When Transferring ECG to PC

This can occur if you are touching the back electrodes or are near a source of electrical noise while the download cable is connected. It does not interfere with the download operation, however to clear the message ensure that the Biolog is resting on an insulated surface and away from power cables, transformers or other electrically noisy equipment.

Unable to take a multi lead ECG with the Biolog Patient cable

Make sure that the cable is connected properly. Examine the cable’s plug for bent pins. Ensure that the Biolog is configured for simultaneous cable support on the setup screen.

Read the instructions for multi lead ECGs carefully. If you press the “Hold” button, only a single lead will be stored. To acquire a multi lead ECG, the “Mode” button must be pressed and held until acquisition mode is entered.

Biolog emits a constant sound

The Biolog will emit a faint sound when the LCD backlight is on. If the backlight is not needed, switch it off using the setup screen (this will greatly extend the battery life).

Serial Number shown at startup as "UUUUU" (or random value)

Won't keep correct time and date

This is likely to occur if the unit is more than 4 years old. Return it to an authorized QRS Diagnostic, LLC service center for routine servicing and testing.

Scrolling lines on the Screen

This can occur if holding buttons while switching the Biolog on. To correct this, turn the Biolog off, remove the batteries for ten seconds, replace the batteries, and turn the Biolog back on, making sure you do not touch any of the buttons.

If the problem continues, contact your QRS Diagnostic, LLC service center.

APPENDIX A: Specifications*

ELECTRICAL CHARACTERISTICS

	6 – 12 Lead	Rear Electrodes
Sampling Rate	500 Hz	300 Hz
Frequency Response	0· 05 – 175 Hz	0· 5 – 100 Hz
Resolution	12 Bit	8 Bit
CMRR:	> 60dB	> 80 dB (0 – 100 Hz)
Isolation	4kV	Requires 6-12 Lead

DISPLAY

Sweep Speed ECG: 20 mm/sec ± 1 mm/sec
Display Sensitivity ECG: 5 or 10 mm/mV ± 0· 5 mm/mV
Viewing Area: 40 × 48 mm
No. of Pixels: 240 h × 160 w
Display Type: LCD
Back Light: Electro-luminescent

MEASURED PARAMETERS

Heart Rate (HR): 20 – 250 bpm ± 2%

POWER REQUIREMENTS

Battery Type: 2 × AA 1·5V Alkaline cells (recommend Sanyo LR6)
Battery Life: (typical) 12 Hours continuous use

PHYSICAL CHARACTERISTICS

Length: 134 mm
Width: 88 mm
Thickness: 32 mm
Weight: 270 g

ENVIRONMENTAL CHARACTERISTICS TEMPERATURE

Operating: 0°C – 40°C
Storage: -20°C – 70°C

HUMIDITY

Operating: 5% – 95%
Storage: 5% – 95%

ATMOSPHERIC PRESSURE

General: 500 hPa – 1060 hPa

**Specifications are subject to change without prior notice.*

APPENDIX B: Notices

Copyright Notice
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The BIOLOG 3000*i* is year 2000 compliant.

ELECTROMAGNETIC COMPATIBILITY NOTICE

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to part 15 of the FCC Rules, AS/NZS3200.1.2:1995 and IEC601–1–2:1993. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio telecommunications. In addition, radio frequency transmitters such as CB radios and wireless or cellular mobile phones may adversely affect this device.

There is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, or is itself affected by equipment off and on, the user is encouraged to try to correct the interference by one or more of the following antenna:

- Reorient or relocate the receiving antenna.
- Increase the separation between the interfering devices.
- Connect the equipment into an outlet on a circuit different from that to which the other equipment is connected.
- Consult the dealer or an experienced radio/TV technician for help.

CAUTION: In order to meet 47 CF R 15, IEC601–1–2 and AS NZS3200.1.2, all cables used to connect this device to peripherals must be shielded. Operation with unshielded cables may result in interference to radio or television reception.